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| 09/900,092 | 07/05/2001 | Yonglin Huang | 15436249191 | 4453 |

22913 7590 10/28/2003

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| EXAMINER |
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CURTIS, CRAIG

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| ART UNIT | PAPER NUMBER |
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2872

DATE MAILED: 10/28/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Applicati n No.

09/900,092

Applicant(s)

HUANG ET AL.

Examiner

Craig H. Curtis

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-- Th MAILING DATE of this communication appears on the cov r sh t with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 July 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

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DETAILED ACTION

Disposition of the Instant Application

- This Office action is responsive to Applicants' Amendment B filed on 28 July 2003, which has been made of record in the file as Paper No. 15.
- By this amendment, Applicants have amended claims 1, 2, 5-7, 9, 12, 15, 18, and 20 & have newly added claim 21.
- Claims 1-21 are currently pending in the instant application.

Claim Objections

1. **Claim 21 is objected to because of the following informalities:** assuming that the angle at which each optical axis is oriented (e.g., 45 degrees, 0 degrees, and 90 degrees) is reckoned with respect to the origin of the same coordinate system, the phrase limitation "...and optically rotated from the first wedge by 45 degrees..." is redundant, inasmuch as the fact that said first wedge is recited to have an optical axis of (read: oriented at) 45 degrees & said third wedge has an optical axis of (read: oriented at) 0 degrees clearly conveys that which Applicant repeats by reciting the "...and optically rotated from the first wedge by 45 degrees..." limitation. **Appropriate correction is required.**

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Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugiyama et al. (JP 11-174382 A).

With regard to claim 1, Sugiyama et al. disclose (see Fig. 1) the invention as claimed--a dual-stage optical isolator comprising:

a first stage (viz., elements 11, 13, and 12) disposed along an optical path (see Fig. 1), wherein the first stage includes a first wedge (11) and a second wedge (12), the first wedge having an optical axis that is different from an optical axis of the second wedge (cf. C_1 & C_2 in the x-y-z coordinate system depicted in Fig. 1); and

a second stage (viz., elements 21, 23, and 22) disposed along said path and mechanically rotated 90° with respect to the first stage, wherein the second stage includes a third wedge (21) and a fourth wedge (22)--**EXCEPT FOR** an explicit teaching wherein the third wedge has an optical axis that is different from the optical axis of the first wedge and the optical axis of the second wedge.

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Although Sugiyama et al. do not explicitly set forth wherein the third wedge has an optical axis that is different from the optical axis of the first wedge, they do depict a first stage and a second stage that, save for the second stage being mechanically rotated 90° with respect to the first stage, appear to be identical to one another. Moreover, the relative orientation of these stages with respect to one another (e.g., the fact that the tapered end of the third wedge is rotated 90° with respect to the tapered edge of the both the first wedge and the second wedge) reasonably suggests that the third wedge does indeed have an optical axis that is different from both the optical axis of the first wedge and the optical axis of the second wedge. In any event, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have disposed the second stage of the dual-stage optical isolator of Sugiyama et al. such that the third wedge have an optical axis different from the optical axis of the first wedge and the optical axis of the second wedge, such teaching having all but explicitly been made by the disclosure of Sugiyama et al., for at least the purpose of minimizing polarization dispersion.

With regard to claim 15, please see comments made above with regard to claim 1, noting in particular the opposed orientation of the third wedge with respect to the fourth wedge and the obviousness to one of ordinary skill in the art at the time the invention was made to have so disposed said third and fourth wedges, for at least the purpose of minimizing polarization dispersion.

With regard to claim 21, Sugiyama et al. disclose the invention as claimed **EXCEPT FOR** the specific relative orientations of the optical axes of the first, second, third, and fourth wedges (*read*: birefringent wedges). It would have been obvious to one having ordinary skill in the art at the time the invention was made, however, to have oriented said wedges such that their optical axes be oriented as

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recited in this claim, for at least the purpose of mitigating polarization dispersion to a desired degree, since it has been held that discovering optimum values of result effective variables involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

With regard to claims 2 & 5, please see Faraday rotators 13 & 23, respectively, in Fig. 1; also note that the first wedge has a first wedge angle, the second wedge has a second wedge angle, the third wedge has a third wedge angle, and the fourth wedge has a fourth wedge angle. And with regard to the second Faraday rotator (23) rotating a polarization plane by 45° , please see ¶ [0011] on p. 4 of 8 in the translated Sugiyama et al. reference

With regard to claim 3, said first and second wedge angles are substantially equal (at least in magnitude, if not in sign). See Fig. 1.

With regard to claim 4, please see ¶ [0011] on p. 4 of 8 in the translated Sugiyama et al. reference.

With regard to claim 6, please see comments made above regard the orientation of the third optical axis with respect to the first optical axis; also note that because both said first stage and said second stage comprise birefringent wedges, said stages are inherently configured to refract a light rate (read: ray) applied in a forward direction into a first ray (e.g., an o-ray) and a second ray (e.g., an e-ray).

With regard to claims 7 & 16, it is noted that due to the relative orientation of the second stage with respect to the first stage, an e-ray with respect to the first stage will necessarily be an o-ray with respect to the second stage, and that an o-ray with respect to the first stage will necessarily be an e-ray with respect to the second stage.

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With regard to claims 8 & 17, the geometry and separation of said first stage and said second stage depicted in Sugiyama et al. satisfy the limitations recited in these claims.

With regard to claim 9, please see the comments made above regarding similar limitations recited in claim 5.

With regard to claims 10 & 11, please see the comments made above regarding similar limitations recited in claims 3 & 4, respectively.

With regard to claim 12, please see above, it being noted that although Sugiyama et al. do not explicitly recite wherein said fourth optical axis is 45 degrees apart from said third optical axis, that it would have been obvious to one having ordinary skill in the art at the time the invention was made to have so oriented the fourth optical axis with respect to the third optical axis, for at least the purpose of minimizing polarization dispersion.

With regard to claims 13 & 14, please refer to ¶ [0011] on p. 4 of 8 in and Fig. 1 of the translated Sugiyama et al. reference

With regard to claims 18-20, please see ¶ [0011] on p. 4 of 8 in and Fig. 1 of the translated Sugiyama et al. reference.

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Conclusion

3. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, THIS ACTION IS MADE FINAL. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

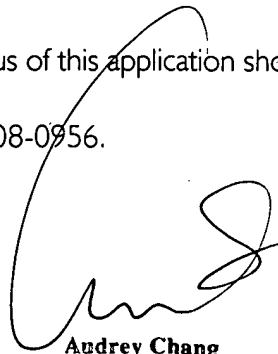
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Contact Information

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Craig Curtis, whose telephone number is (703) 305-0776. The centralized facsimile phone number for the USPTO is (703) 872-9306.

Any inquiry of a general nature regarding the status of this application should be directed to the Group receptionist, whose telephone number is (703) 308-0956.

C.H.C.
Craig H. Curtis
Group Art Unit
22 October 2003


Audrey Chang
Primary Examiner
Technology Center 2800